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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/520,853	01/10/2005	Holger Thielert	THIELERT -3 PCT	2683

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EXAMINER	
MERKLING, MATTHEW J	
ART UNIT	PAPER NUMBER
1764	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/520,853	THIELERT, HOLGER	
	Examiner	Art Unit	
	Matthew J. Merkling	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 January 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/10/05 and 5/7/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The examiner considered the international search report listed in the IDS filed on 5/7/07 but lined through it as it is not a published document available to the public and will not be listed on the face of the patent if one is to be issued.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 1 recites the limitation "the mantle side" in line 14. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at

> the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keller et al. (US 2002/0134706) in view of Autenrieth et al. (US 5,935,277).

Regarding claim 1, Keller discloses a reaction system for desulfurization of a gas stream (see abstract), comprising a boiler (40) lined with refractory material (53, paragraph 67), which comprises a combustion chamber/mixing zone (48) having an inflow opening (see left size of Fig. 2), a catalyst chamber (45) having a catalyst bed (47), and a chamber on the outflow side (see Fig. 2), having a gas outlet (56) for hot process gas, wherein the boiler (40) is configured as a horizontal boiler (see Figs. 1 and 2), in which the combustion chamber (48), the catalyst chamber

(45), and the chamber on the outflow (see Fig. 2) side are disposed next to one another, and that the catalyst chamber (45) is delimited, on both sides, in the flow direction, by gas-permeable checker bricks (thermal radiation barrier, (46)).

Keller fails to teach a fill opening for introducing the catalyst bed.

Autenrieth also discloses a reaction system containing a catalyst.

Autenrieth teaches an opening (25) in the side of the reaction section (see Fig. 3) as a preferable way of easily removing catalyst (2) without requiring demounting operations on the reactor housing (col. 7 lines 4-35).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the opening in the side of the reaction section, as in Autenrieth, to the reaction system of Keller as a preferable way of easily removing catalyst without requiring demounting operations on the reaction section housing.

Regarding claim 2, Keller, as discussed in claim 1 above, further discloses the flow opening and gas outlet are disposed on opposite faces of the boiler (see flow direction through boiler ((40) in Fig. 1).

Regarding claim 3, Keller, as discussed in claim 1 above, further discloses the checker bricks (thermal radiation barrier, (46)) is made from a porous ceramic material which has elongated pores (paragraph 43).

7. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keller et al. (US 2002/0134706) and Autenrieth et al. (US 5,935,277) as applied to claim 1 above, and further in view of Vora et al. (US 6,280,609) and Apffel (US 4,597,788).

Regarding claims 4 and 5, Keller discloses the product from the reaction system described above is further treated in a catalyst bed (20) downstream of the boiler (40). Keller discloses that a portion of this product stream, after cooled in a waste heat boiler (60, which also serves as a means of condensing elemental sulfur and producing steam (see Fig. 2)) and condenser is heated back up by exchanger (24) and charge heater (16) prior to entering the catalyst bed (20).

Keller fails to teach that wherein on the circumference of the chamber on the outflow side, a line is connected, which opens into a process gas line adjacent to the boiler, in the opening region of the branch line.

Vora also discloses a reaction system.

Vora teaches a portion of an effluent stream (14) is used to preheat a stream (10) to a desired temperature prior to entering a reactor (18) in order to eliminate the need for a charge heater and subsequently reducing the capital cost of the reaction system (col. 9 lines 16-30).

It would have been obvious to one of ordinary skill in the art at the time of the invention to remove a portion of the effluent stream (as in Vora) from the chamber downstream of the catalyst chamber and prior to the waste heat boiler (of modified Keller) and connect this portion to the line directed from the outlet of the waste heat boiler (60 of Keller) to the catalyst bed (20) in order to utilize heat from the effluent stream more efficiently and eliminating the need for an extra heat exchanger or charge heater and subsequently reducing the capital cost of the reaction system.

Keller, as modified above, teaches the combination of two streams with substantially different temperature, but fails to teach a temperature control valve (valve body) on the outlet line from the chamber downstream of the catalyst chamber.

Apffel also discloses a system of combining two streams of substantially different temperature.

Apffel teaches a temperature control valve (34) that opens and closes a valve body which regulates flow of a temperature controlling stream (in this case, a refrigerant) in order to selectively control the temperature of a process stream (col. 5 lines 46-55).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the temperature control valve with adjustable valve body of Apffel to the line from the chamber downstream of the reaction chamber of the modified Keller in order to selectively control the temperature of the inlet stream to the catalyst bed (20) of modified Keller.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Merkling whose telephone number is (571) 272-9813. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MJM

Glenn Caldarola
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Technology Center 1700